

2016 Soybean Vein Necrosis Disease Survey

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Soybean Vein Necrosis Disease (SVND) is a relatively new viral disease affecting soybeans. The virus is transmitted by thrips, a small insect with piercing-sucking mouthparts. Immature thrips that feed on infected soybeans acquire the virus, and can transmit it the remainder of their lifetime. Our data indicate that cropping system and variety can impact viral symptoms, and that yield loss may occur in some variety x cropping system combinations. Over the past three seasons we have surveyed grower fields for symptoms of SVND to see when the disease occurs and if occurrence may be more severe at some points in time or cropping systems. This season, in addition to assessing SVNV, we assessed the thrips population to see what species of thrips occur on Delaware soybeans and where they can be found most often on the plant in different growth stages and cropping systems of soybeans. These data will help us better understand SVNV and its potential to impact soybeans in DE. We would like to thank you for allowing us to survey your fields and for participating in the survey.

Results

In 2016 a total of 23 soybean fields (11 double crop, 12 full season) were surveyed twice during the growing season. Full season was surveyed on 7/18-19 and again on 8/3-4, whereas double crop fields were surveyed on 8/12 and 8/25. For each field, twenty sites were randomly selected and a single plant assessed for the presence of SVND. At each site, a fully expanded trifoliolate and, if present, a flower in the upper 1/3 of the canopy were sampled for thrips. SVNV samples were sent for confirmation of virus, whereas thrips samples were purified and individual thrips for each sample and part enumerated and identified to species. Data were statistically analyzed. Only significant results are presented here.

SVND was more severe in double crop soybeans than full season soybeans (Figure 1). Consistent with the past two seasons, SVND severity in double cropped soybeans sampled early were similar to full season soybeans sampled late (Figure 2). We speculate that this may result in a greater chance to observe yield impacts in double cropped soybeans, as the virus can spread and affect the crop more over time.



Figure 1. Foliar symptoms of SVND on a soybean leaf.

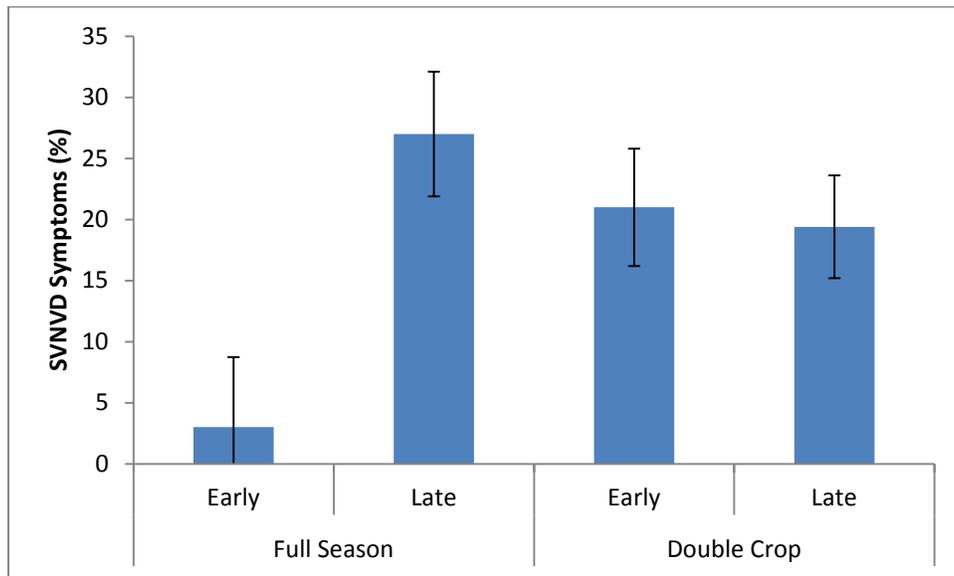


Figure 2. SVND severities for full season and double cropped beans as affected by sampling time. Early sampling dates targeted vegetative to early flowering periods (V4-R1), whereas late sampling dates targeted reproductive growth stages (R3-R5).

Consistent with SVND severity, thrips abundances were greater in double cropped soybeans than full season soybeans (Figure 3). Four species of thrips were detected including Soybean thrips, Western flower thrips, Eastern flower thrips, and Tobacco thrips (Figure 4). Research has shown the Soybean thrips and Western flower thrips can transmit the virus causing SVND.

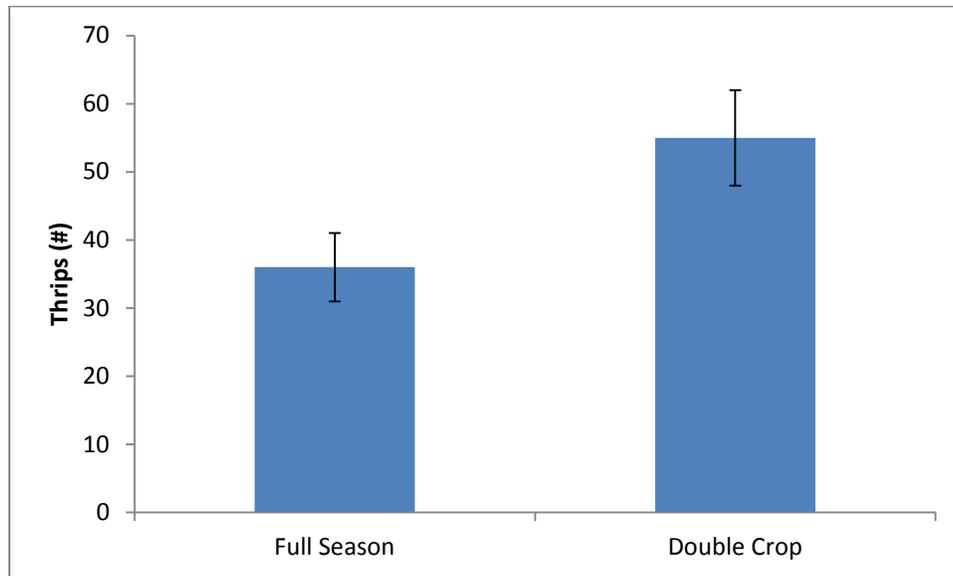


Figure 3. The average number of thrips found per field in full season and double cropped soybeans in Delaware, 2016.



Figure 4. An example of soybean thrips and thrips damage on a soybean leaf (image obtained from www.purdue.edu).

Both Soybean thrips and Western flower thrips abundancies differed with cropping system and plant part. Soybean thrips were more abundant in double cropped soybeans when compared to full

season soybeans (Figure 5). Plants sampled early had more Soybean thrips in flowers as compared to on leaves. In late samples, the opposite was observed (Figure 6).

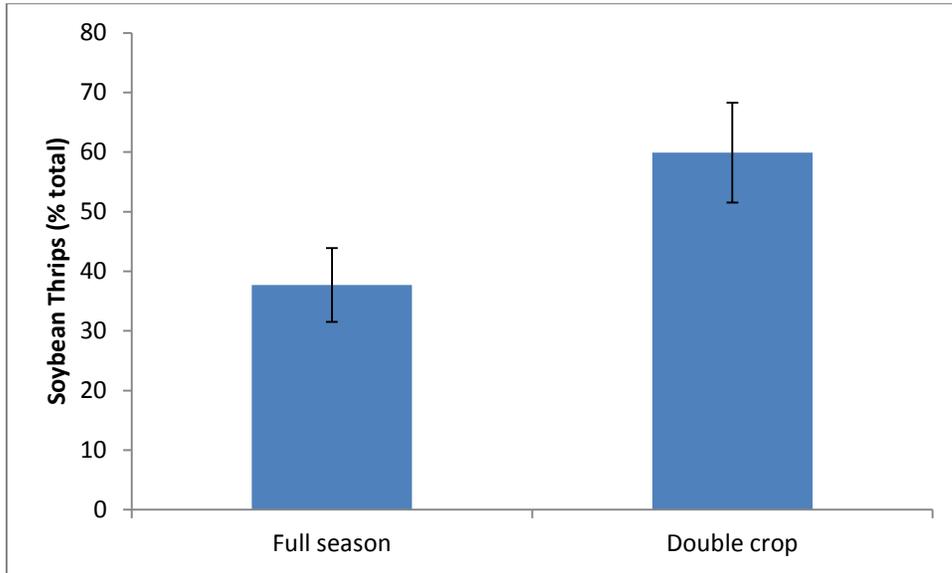


Figure 5. Average percentage of thrips that were Soybean thrips in full season soybeans surveyed in Delaware, 2016.

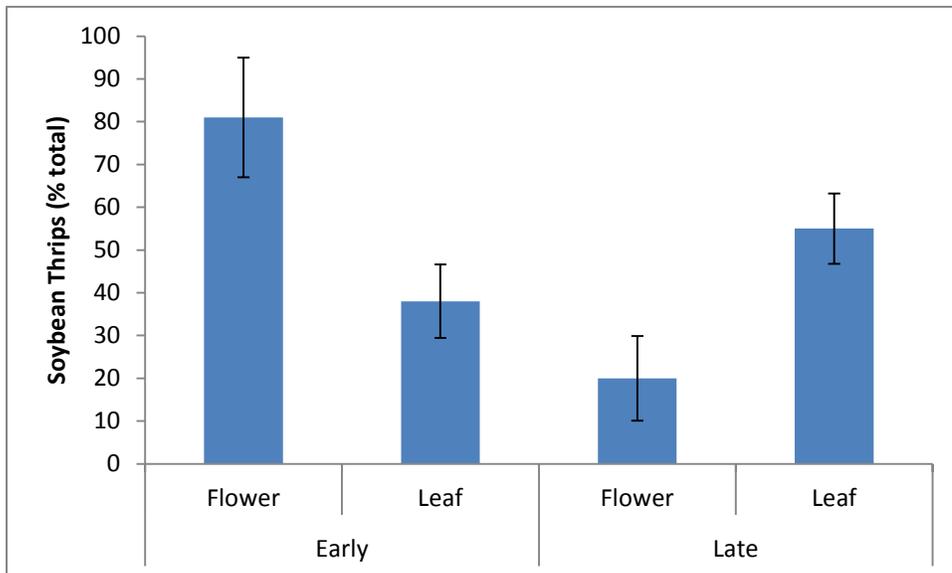


Figure 6. Average percentage of thrips that were Soybean thrips as affected by survey timing and plant part for soybeans surveyed in Delaware, 2016.

Western flower thrips were more abundant in full season beans surveyed late in the season, but were not commonly observed in double crop systems (Figure 7). In full season fields, more Western flower thrips were found in flowers as compared to the foliage in full season plants (Figure 8).

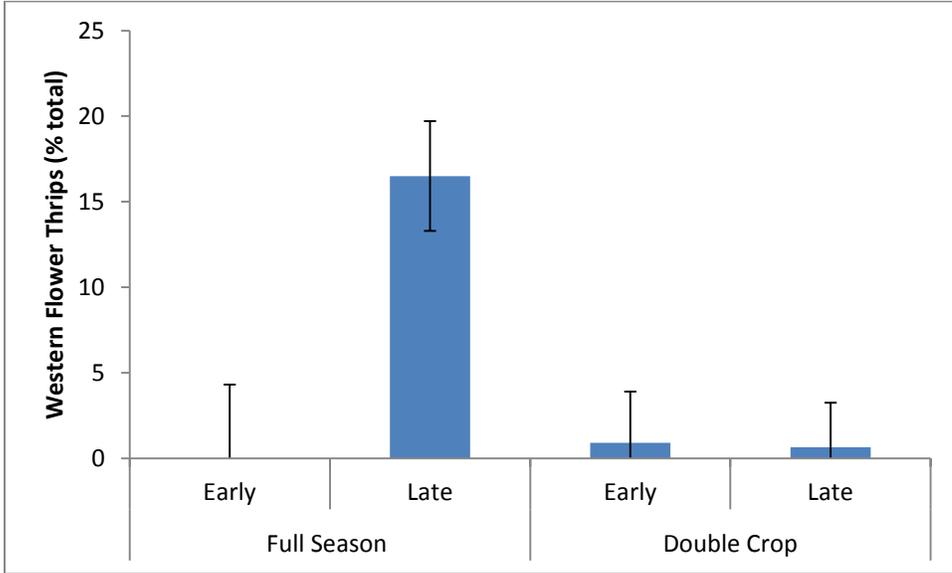


Figure 7. Percentage of total thrips that were Western flower thrips as affected by cropping system and survey timing for soybeans in Delaware, 2016.

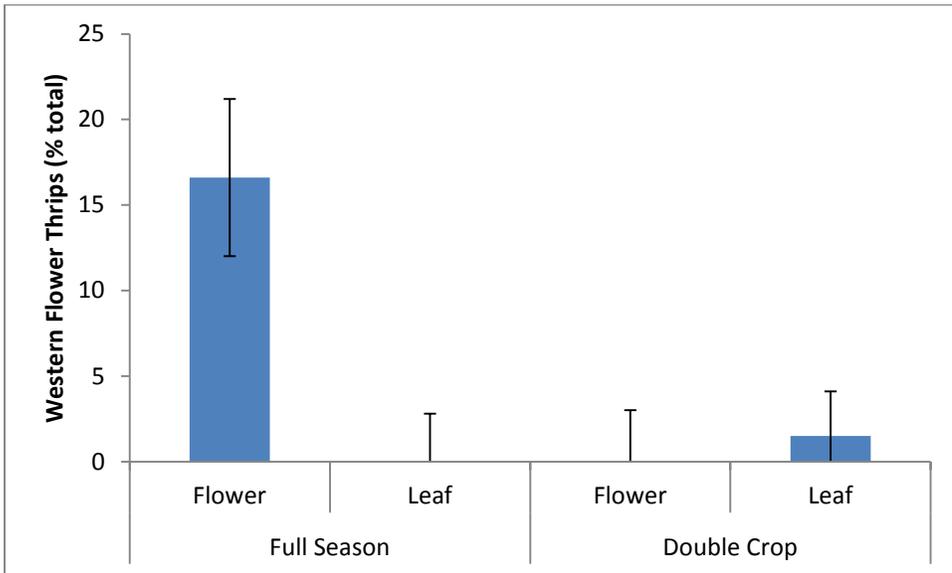


Figure 8. Percentage of total thrips that were Western flower thrips as affected by cropping system and plant part for soybeans in Delaware, 2016.

Summary

SVND occurs often in Delaware soybean fields. In full season fields, symptoms develop late in the growing season, often after pod set, whereas symptoms can develop earlier in double cropped soybeans. This is likely a function of thrips population dynamics during the growing season. We found four species of thrips in Delaware soybean fields, two of which are known to vector the virus causing SVND. Soybean thrips were the most common, and were found at higher abundances in double cropped fields than full season fields, tracking symptoms of disease. Western flower thrips were more common late in the season in full season fields but were relatively uncommon in double cropped fields. More soybean thrips were found in flowers during the early survey periods than those occurring later in the season. Thus, these thrips may remain protected from foliar applications of contact insecticides which may be aimed at suppressing these insects. In addition, systemic insecticides may not accumulate to a significant degree in flower tissues and therefore not reduce populations to a degree sufficient to reduce thrips populations. Research from Delaware indicates that, in addition to cropping system, variety plays a significant role in SVND effects and symptomology. It is likely that, if SVND becomes a consistent, yield-limiting issue, that variety selection will be a cost effective means for managing this disease. Additional research is needed to better understand this disease and its impacts on soybeans grown in the region.